



Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

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ملخص البحث باللغة العربية

يعد الإيقاع الحركي المنتظم مكوناً هاماً لممارسة جميع أنواع الرياضة التي تعتمد على النظام الهوائي حيث يساهم في رفع مستوى الإنجاز، لأنه يساعد على تحسين مستوى العتبة الفارقة اللاهوائية.

وفي حدود ما أمكن لباحث التوصل اليه من أبحاث واختبارات لم يتمكن من العثور على اختبار قابل للتطبيق الميداني للإيقاع الحركي المنتظم. وبناء عليه فإن الهدف من هذا البحث هو "بناء اختبار للإيقاع الحركي المنتظم للذراعين للأطفال في المرحلة العمرية (١١-١٢) سنة، اعتماداً على تعريف هذا الإيقاع الوارد بالبحث،

وقد اشتملت عينة بناء الاختبار (١٩٠) طالب وطالبة تم اختيارهم عشوائياً من طلاب مدرستين من مدارس المرحلة الابتدائية بمحافظة الجيزة، وقد أكمل منهم إجراءات بناء الاختبار (١٦٠) طالب وطالبة منهم (٩٠) طالب و(٧٠) طالبة كما اشتملت إجراءات بناء الاختبار على تعرف الخصائص السيكومترية للاختبار.

وأوضحت النتائج أن الاختبار صادق لقياس ما صمم من أجله ويتمتع بالثبات والموضوعية.

كلمات مفتاحية: بناء- اختبار- الإيقاع الحركي المنتظم- الأطفال

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

Summary

Regular Movement rhythm is an important physical component in all types of sport which depend on aerobic system for improvement achievement, as it help to increase level of anaerobic threshold ,in spite of that the researcher couldn't find an applicable field test to be used.

The aim of this study is “construction Regular rhythm test for two arms movements to children age stage (11-12) years old”, Depending on the definition of regular rhythm of movement mentioned in this study.

To construct the test (190) students of elementary school children at this age stage were chosen randomly from two primary school students in Giza governorate,(160) of them completed test construction procedures (90)boys and (70) girls.

Construction of test procedures were carried out trough Identifying test content, and Psychometric properties for that content.

Result showed that test content are reliable, relevant to its purpose and valid to measure rhythm test for two arms movements.

Key Words: construction, rhythm, test, children.

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

Introduction

In our daily life activities we frequently hear people use ward " Rhythm "in different occasions such as " his Rhythm of dealing with matters is so slow as if he own all time", "The Rhythm of life in our city is faster than it in suburbs ," the movie story was such poring that it has so slow Rhythm " .

Human biology research literatures declared that a Healthy individuals exhibit circadian rhythms in several vital signs (Davidson, S. et al,2020) , also declared that there are different types of rhythm control our body systems such as cardio respiratory system (Griffith, m. 1981,pp. 107-129,159-170), and central nervous systems(G Buzsáki. 2011) , each of these body system has its own special rhythm which is so important for its function that it could be used for evaluation of that system efficiency.

also in field of sport we here using ward of Rhythm in different type of sport such as” the Rhythm of game was too slow that spectators left before end of the event,” the movement Rhythm of athlete in artistic gymnastic was not in consistent with the accompanied music Rhythm” .and “ The stroke Rhythm of rowing boat was faster at end of race than it was along the middle of the race distance” .

Several studies in sport and physical education reported importance of rhythm, for movement and sports, as Nancy A. Schwanda (1969) declared that importance in her study” A study of rhythmic ability and movement performance”, according to Cote- Lourance (2000)rhythmic abilities facilitate the success in Ballet, Borysink,z and Waskiewice,z(2008)claimed that fencer’s foot work rhythm provide information about the distance between the fighting opponents, also

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

Macpherson, A. C., Collins, D., & Obhi, S. S. (2009) pointed to Importance of Temporal Structure and Rhythm for the Optimum Performance of Motor Skills. Shaffer, L. H. (1982) reported that “rhythm applied to ball games provide attitude of calmness and fluency of performance”.

From what mentioned about rhythm in sport we could say that it is an indicator for quality and efficiency of performance in each type of these sports.

Dictionaries have a several definitions for rhythm as Cambridge advanced learner’s defined it” A regular movement or pattern of movements”(Walter. 2013) ,also the free dictionary defined it as” movement or procedure with uniform or patterned reoccurrence of a beat ,accent, or the like” (2003,review of Rhythm in Farlex ,inc (ed.), The free dictionary), and Oxford treasure of English dictionary defined it as ”a regular pattern of changes or events”(2010,review of rhythm, in Oxford treasure of English).

Sport and physical education Literatures mentioned several definitions for Rhythm as Simpson, S. E. (1957, p10) defined rhythm as "an innate characteristic which individuals possess, and to which they may respond by motor reaction” Johnson, & nelson. (1969, p327) , Mentioned that rhythm is "flow of movement with the regular repetition of beat in grouping movements for the successful execution of a pattern or skill” .

Rhythm also defined as” periodic succession or regular recurrence of events in time which constitute the organization of temporal relationship (Smoll, F. L. 1973) also Sögüt, M., Kirazci, S., & Korkusuz, F. (2012) mentioned that it is “the dynamic grouping, structuring and accentuation of sequential elements of a process, of

which arrangement is determined by a required and/or personally selected temporal scheme.

Based on rhythm previous definitions researcher conclude that the main components that affect rhythm organization include three main components which are time, space and motor responses.

Time referred to the length of time for motor responses ,Space referred to the expanse of movement in all directions occupied during the motor responses, Motor responses referred to body or body part movement speed during time and space of movement.

Based on the above mentioned about components that affect rhythm, researcher proposes the following definition for movement rhythm as:

“Amount of change in speed of motor responses for body or body part relating to time and space of movement”.

According to proposed definition researcher expect that there are irregular and regular types for movement rhythm relating to amount of changing in speed of motor responses in space during movement time

from point of view of the researcher regular rhythm has an important role for improvement sport achievement for athlete as it help reaching steady state performance which lead to improvement in aerobic threshold which athletes aim for improving their sport achievement in different sport. So the researchers propose the following regular movement rhythm definition.

” A constant amount of speed for body or body part relating to time and space of movement”.

-Study purpose

Researcher couldn't reach an applicable field test for measuring regular rhythm for body or body part in general, or find such test which could be applied on children in particular, So The aim of this study is

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

“construction Regular rhythm test for two arms movements for children age stage (11-12) years old”, Depending on the definition of regular rhythm of movement mentioned in this study

-Participant

as the age of (11-12) years old characterizing with perfection of motor growth (Allawy , 1987 pp124-138),190 students of elementary school children at this age stage were chosen randomly from two primary school students in Giza governorate,160 of them had completed test construction procedures the total number of boys participated in study were (90) and total number of girls were (70).

-Instrument for data collection

The researcher carried out the following steps for preparing an Instrument for data collection in this research:

➤ First step- Identifying test content

For identifying test content, researcher followed following procedures.

1 - Determining test content domain.

Test content domain identified through literature reviewed on the topic of rhythm in this research (Smoll, F. L. 1973, Simpson, S. E. 1957 , Söğüt, M., Kirazci, S., & Korkusuz, F. 2012)

2- Preparing Test items

test items made through reviewing purpose and regular rhythm definition mentioned in this research to ensure that the test items reflect of and relevant to research purpose and definition of regular rhythm.

3-Refining test items

Refinement of tests items was accomplished through the following two preliminary test applications to assure that its items have a usable applicable form.

- First preliminary test application

- Application goal

First: Checking up duties of assistants during tests administration.

Second: revising suitability, adequacy of equipments used in test.

- Application sample

Tests were applied on (20) students from research population away of research sample.

- Application results

First: Researcher noticed that assistant who are counting test performance for students with a loud voice affect the students' rhythm, therefore, the assistants were instructed not to count students test performance with a loud voice. In addition, the application showed that assistants mastered their duties during administrating tests.

Second: The application showed need to provide piece of (A4) size paper to be placed on the chest of the tested student during test performance to put hands on it, to prevent him from moving one hand from its place on chest before the other hand return to its position on chest. The fall of the paper means a faulty performance as student two hands have left their place on the chest at the same time.

-Second preliminary test application

- Application goals

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

First: Ensure that students understand purpose of test performance.

Second: Identification any common mistakes in students' test performance.

Third: revising test instructions for avoiding test performance mistakes.

Fourth: revising penalties for committing mistakes during test performance.

Fifth: revising test procedures for score calculation.

- Application sample

Tests were applied on (30) students from research population away of research sample.

- Application results

First: some students were trying to perform tests at full speed.

Accordingly, the students were instructed before testing that the aim of tests is to realize constant speed of movement in all test intervals through making same counts of test movements in each test intervals. For helping them to achieve this goal, assistants who record the results were instructed to inform testee student the number of movement counts at end of each test interval, in order to achieve the same number at next test interval.

Second: following are common mistakes which were noted in student's performance:

-Not touching wall or touching the wall with their fingertips and/ or without extending elbows.

- Moving feet to cross feet line (line drawn on the ground in front of feet).

-Leaning trunk forward while touching wall with hand.

-Not performing test in its correct order.

- stopping during test interval performance so they could have an even score with student who does not stop during test performance. Researcher noticed from Calculation mistakes for a testees, that 90% percent of students performed test without or with less than (3) mistakes.

Third: For avoiding test performance mistakes, instructions of test were modified to include following instructions to student:

:1- extend elbows to touch the wall with base of metacarpals and fingers,

2- Stand still without moving feet to cross feet line,

3- Keep trunk erected while test performance,

4- Perform test in its correct order which have seen before test performance.

5- Don't stop during test performance, ,

6- It is not allowed to commit more than (2) mistakes during performance any test interval.

Fourth: test penalties for committing mistakes will be as the following:

- committing any of (1-4) mistakes in test interval performance the assistant wouldn't count it in student's result for interval.

-In case of student stop during performance of any test interval the result of test interval will be cancelled and student takes an extra test interval, if student stop again in the same interval result of test equal zero.

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

-in case of making (3) mistakes or faulty performance during any of test interval, the result of test interval will be cancelled and student takes an extra test interval .if he repeat the same number of faulty performance in the same interval the result of test equal zero .

Fifth: revising the procedures for score calculation showed that it's need to be amended, as procedures for Calculation result of student performance are:

- 1- Subtraction the test performance counts in the first interval from test performance counts in second interval.
- 2-subtraction the test performance counts in second interval from test performance counts in third interval.
- 3-subtraction the test performance counts in third interval from test performance counts in first interval.
- 4- The score for student is the result of adding results of three intervals subtractions neglecting algebraic signs.

As The direct calculation result of the test score was difficult to be understood in practical application of test because the smaller score is better than higher one, there for, the researcher decided to amend these procedures through adding the following step in calculation student score:

- 5- The student final score is the resultant of subtracting test result in step (4) from (30) as constant number¹, the maximum score for the tests will be (30) and the minimum will be (zero).

Second step-identifying Psychometric properties for test

¹ The constant number set to be more than probable result of student performance during items (1-4) in the procedures of score calculation in .

Literature review refer that Psychometric properties for tests could be realized through Validity, Reliability and objectivity characteristics (Souza2 017) ,(Zhang 2014) ,(Hall, B. W. (1986).

Tests validity

Researcher Realized test validity through:

A-Face validity

Face validity determined through constructing test items in light of definition of regular rhythm mentioned in this research, then asking assistants after preliminary applications of tests, about its clarity, ambiguity, and if there is any misunderstanding of tests procedures, All of (6) assistants agreed that the test seem to measure what is designed for.

B-Content validity

Content validity determined through sending tests to four experts, who are aware of rhythm concept to determine clarity and relevancy of tests items.

The following table was printed on the cover letter of the test to guide expert for evaluating tests content validity according to scale² .

Table (1) regular rhythm arm test items clarity and relevancy scale

clarity				Relevancy			
Test item	1	3	5	Test item	1	3	5
Test purpose				Test purpose			
Assistants duties				Assistants duties			

² One= not clear or relevant, .three =clear or relevant, five=very clear or very relevant.

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

Test equipments	Test equipments
Test instructions	Test instructions
starting position for test	starting position fo test
test description	test description
Penalties	Penalties
test score	test score

The following tables show results of Calculation Kendall's W test for raters about clarity and relevancy of Regular rhythm test for two arm movements.

Table (2) Kendall's W test result for clarity of regular rhythm test items for two arm movements

R	item	mean	Std. Deviation	minimum	maximum	Mean rank	K W	df	Asymp.sig
1	8	4.1250	1.457	1	5	2.88	.688	3	.001
2	8	4.0000	0000	4	4	2.33			
3	8	3.0000	0000	3	3	1.19			
4	8	4.8750	.353	4	5	3.56			

Results in table above shows that, there are concordances between ratters about clarity of Regular rhythm test items for two arms movements as significance value for (Kw) value is less than .05.

Table (3) Kendall's W test result for relevancy of regular rhythm test items for two arm movements

R	item	mean	Std. Deviation	minimum	maximum	Mean rank	K W	df	Asymp.sig
1	8	4.7500	.46291	4.00	5.00	3.06	.548	3	.004
2	8	4.2500	.70711	3.00	5.00	2.13			
3	8	4.0000	.75593	3.00	5.00	1.75			
4	8	4.7500	.46291	4.00	5.00	3.06			

Results in table above shows that there are concordances between ratters about relevancy of Regular rhythm test items for two arms movements as level of significance for (Kw) value is less than .05.

Test Reliability and objectivity

Reliability and objectivity of arms test was calculated through test and retest application with one week interval in between of the two applications considering dividing students to groups and changing persons who execute test from persons who execute retest to allow student to be tested by different person in each test application. The following table shows T test value results:

Table (4) paired sample t test for reliability and objectivity of regular Rhythm test items for two arms movements

pair	n	mean	Std. Deviation	t	df	Sig.
Test arm	160	3.5438	3.17388	1.009	159	.157
Retest arm	160	3.9375	3.65611			

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

Results in the table above shows that significance value for t test is more than .05, which assures that there is no difference between (test / retest) results for arms test, which mean it is reliable and objective.

Result

The previous procedures lead to establish the following regular rhythm test for two arms movements for children age stage (11-12) years old.

Test description.

The student stand in front of a wall with his feet apart from each other a distance that equal his pelvic width, raising his arm in front of him up to his shoulders level touching the wall with base of his metacarpals and fingers ,using a yardstick the jury draw a line with a **chalk passing by** places of student's of metacarpals and fingers on the wall, and draw another line on the ground in front of student metatarsals feet, the student take starting position for test with his arms bent on a piece of paper on his chest to prevent it from falling down considering keeping his elbows beside his body

At starting signal from a jury student extend one arm to touch the wall with his metacarpals and fingers above the drawn line on wall then it return back to its place on the paper on his chest ,then the other hand do same thing to return back to staring position.

The performance continues for (30) second interval, then he stops to be informed about the correct counts he made during the interval.

Then he repeats that performance for two more intervals.

Discussion and conclusion

The test have an acceptable level of confidence in its Psychometric **properties** as Result for Calculation of Kendall's W test for its items clarity was (. 688) and calculation of Kendall's W test for its item relevancy was (.548) also the values of significance for both were less than ,05 which assure **its content validity** .

Also result of calculation reliability and objectivity through test and retest showed that the t test value was (1.009) and its significance value was more than 0.05 which assures reliability and objectivity of test.

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

References

- Allawy, Mohamed ,(1987), sport physiology, Dar el Maaref,Cairo
- Borysiuk, Z., & Waskiewicz, Z. (2008). Information Processes, Stimulation and Perceptual Training in Fencing. *Journal of Human Kinetics*, 19(1). <https://doi.org/10.2478/v10078-008-0005-y>
- Cote-Laurnce,P,(200),The Role of Rhythm in Ballet Training. *Research in Dance Education*,1(2),173-191. <https://doi.org/10.1080/713694263>
- Davidson, S., Villarroel, M., Harford, M., Finnegan, E., Jorge, J., Young, D., Watkinson, P., & Tarassenko, L. (2020). Vital-sign circadian rhythms in patients prior to discharge from an ICU: a retrospective observational analysis of routinely recorded physiological data. *Critical care (London, England)*, 24(1), 181. <https://doi.org/10.1186/s13054-020-02861-2>
- G Buzsáki. (2011). *Rhythms of the brain.* (pp111-136), New York: Oxford University Press.
- Griffith, m. (1981). *introduction to human physiology* . new York: Macmillan
- Hall,B,W.(1986).Validity, Reliability, and Norms of popular versus Less popular published Educational Achievements. *The Journal of Educational Reaserch*,7(9),145-150. <https://doi.org/10.1080/00220671.1986.10885666>
- Johnson, & nelson. (1969). *practical measurements for evaluation in physical education* (third, p. 327) Review of practical measurements for evaluation in physical education. Burgess

Macpherson, A. C., Collins, D., & Obhi, S. S. (2009). The Importance of Temporal Structure and Rhythm for the Optimum Performance of Motor skill: A New Focus for practitioners of sport psychology. *Journal of Applied Sport Psychology*, 21 (sup1), S48-S61.

<https://doi.org/10.1080/10413200802595930>

Schwanda, N. A. (1969). A Study of Rhythmic Ability and Movement Performance. *Research Quarterly. American Association for Health, Physical Education and Recreation*, 40(3), 567-574.

<https://doi.org/10.1080/10671188.1969.10614879>

Shaffer, L. H. (1982). Rhythm and timing in skill. *Psychological Review*, 89(2), 109–122. <https://doi.org/10.1037/0033-295x.89.2.109>

Simpson, S. E. (1957). To develop and validate an objective measure of locomotor response to auditory rhythmic stimuli. Open.bu.edu. Retrieved from <https://hdl.handle.net/2144/23974>

Small, F. L. (1973). A Rhythmic Ability Analysis System. *Research Quarterly. American Association for Health, Physical Education and Recreation*, 44(2), 232-236.

<https://doi.org/10.1080/10671188.1973.10615200>

Söğüt, M., Kirazci, S., & Korkusuz, F. (2012). The Effects of Rhythm Training on Tennis Performance. *Journal of Human Kinetics*, 33(1), 123–132. <https://doi.org/10.2478/v10078-012-0051-3>

Souza, A. C. de, Alexandre, N. M. C., Guirardello, E. de B., (2017). Propriedades psicométricas na avaliação de instrumentos: avaliação da confiabilidade e da validade. *Epidemiologia E Serviços de Saúde*, 26(3), 649–659. <https://doi.org/10.5123/s1679-49742017000300022>

walter. (2013). [Review of rhythm]. In *Cambridge Advanced Learner's Dictionary* Retrieved from

Construction a Regular rhythm test for two arms movements to children age stage (11-12) years old

<https://dictionary.cambridge.org/dictionary/english/rhythm>

Zhang, C.-Q., Si, G., Chung, P.-K., Du, M., & Terry, P. C. (2014). Psychometric properties of the Brunel Mood Scale in Chinese adolescents and adults. *Journal of Sports Sciences*, 1–12. <https://doi.org/10.1080/02640414.2014.898184>

(2010). [Review of rehtym]. In oxford treasura of Enhlish. Retrieved from

<https://www.google.com/search?q=online+dictionary&client=m>

(2003). [Review of rhythm]. In Farlex, Inc (Ed.), *The free dictionary*. Retrieved from

<https://www.thefreedictionary.com/rhythm>